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Periodontal Treatment Followed with Metal Frame Partial Denture For Support Periodontal Health: Two Case Report

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Abstract

A removable partial denture is a definitive prosthesis used in dentistry for decades to rehabilitate partially edentulous patients. Metal frame partial dentures can also function as permanent splints if the remaining periodontal tissue is compromised. Case Report: The first case was a 47-year-old woman complaining of loose lower front teeth. An intraoral examination showed that the anterior teeth had degree 2 mobility. Clinical diagnosis of generalized periodontitis stage III grade C. The patient admitted that she wanted to keep her tooth. In the second instance, a 38-year-old male complained of loss of the upper front tooth. Based on intraoral examination showed that the anterior teeth of the upper teeth had degree 2 mobility. Clinical diagnosis of generalized periodontitis stage III grade B. Case Management: In these two cases, mechanical debridement, splinting temporary, and flap surgery were held in phase I, and phase II, and maintenance therapy was carried out; after being evaluated, metal frame partial dentures were used as splints permanently according to the indication for each case. Discussion: Providing comfortable and useful removable partial dentures requires diagnosis, planning, and following a periodontal treatment sequence to avoid harm to the compromised periodontal tissues. Conclusion: After all periodontal treatment, permanent splints with metal frame dentures can stabilize the periodontal tissue. Removable partial dentures with metal frames are the best option to preserve the remaining natural teeth.

Keywords: Periodontal Compromise; Tooth Mobility; Deep Pockets; Bone Loss; Metal Frame

1. Introduction

Partially dentate adults have become more common; many might require their missing teeth replaced.[1] Aesthetics, the prosthesis' durability, and the periodontium itself will all be impacted if the prosthesis and periodontium are not in harmony.[2] Almost fifty years ago, the idea of periodontal prosthesis contributed to the definition of this relationship. Treatment plans may be formulated in the patient's best interest and represent a greater value for the patient.[3]

An evaluation of the periodontal tissue should be done before denture construction, as periodontal disease frequently causes issues with denture planning. When gingivitis or periodontitis is present, it must be treated before dentures are made.[4] The denture supports the facial muscles in the area of the face and improves chewing

ability.[5] An inflammatory condition known as periodontitis is brought on by bacterial biofilm in the margin gingiva and is characterized by alveolar bone loss, gingival inflammation, and gingival inflammation. If left untreated, the loss of attachment and alveolar bone can lead to increased tooth mobility.[6] There are two ways to treat periodontitis: non-surgical and surgical.

The non-surgical approach includes oral hygiene instructions, scaling and root planning, occlusal adjustment, splinting, and antibiotic therapy. [7,8] Tooth mobility is one of the periodontal problems that must be overcome using periodontal splints. Splinting is a crucial therapy or treatment that can be carried out to support the healing of periodontal tissue. The splint action stabilizes the loose teeth so that the occlusal pressure is distributed evenly to the other teeth. Treatment with splints requires attention to several things, namely tooth mobility, remaining supporting bone, the relationship between the crown and the tooth root, the position and condition of the teeth, and gingival inflammation.[9]

Several things that the clinician must pay attention to before splinting are looking for the cause of tooth loss, paying attention to the quantitative and qualitative loss of periodontal supporting structures, for example, due to traumatic occlusion, and also paying attention to periodontal tissue after periodontitis treatment.[8] A clinician has to be able to classify them to make the best use of the splint materials.⁴ Periodontal splints consist of several types, which are divided based on the time of use; periodontal splints can be divided into temporary, stabilized, and permanent splints. While the periodontal splint, based on its position on the teeth, can be divided into intra-coronal and extra-coronal splints. Removable denture appliances can restore a patient's esthetic, mastication, and speech function.[4] Metal frame partial denture is an extra-coronal splint used in moderate to severe tooth mobility cases.[10] Metal frame partial denture is one of the permanent splints for periodontally compromised teeth.[4] This case report aimed to describe metal frame partial dentures that can also function as permanent splints if the remaining periodontal tissue is not good.

2. Case Report

2.1. Case 1

A 47-year-old female patient came to the Dental and Oral Hospital Universitas Sumatera Utara Periodontics Clinic with a chief complaint of anterior tooth lower jaw mobile since one month ago. She also complained that her gums often bleed when brushing her teeth. The patient had difficulty chewing due to loose lower front teeth. The patient wanted to chew food properly. Intraoral examination revealed deep pockets and gingival recession on teeth 31, 32, and 41 with degree 2 mobility. A pulp sensitivity test on the teeth showed a positive result. Radiograph examination showed severe bone loss on teeth 31, 32, and 41 and increased periodontal ligament space. (Figure 1A) Clinical diagnosis of generalized periodontitis stage III grade C

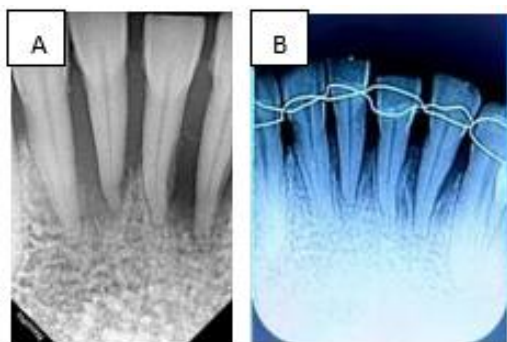


Figure 1. Radiograph view A. Before initial treatment B. After 6 months of periodontal therapy

Phase 1 of periodontal therapy included scaling root planing, occlusal adjustment, and splinting. (Figure 1B) A metal frame with Akers clasp design on 34, 37, and 48 was designed based on working models. Preparation seat rests were prepared to create occlusal rest for teeth 34, 37, and 48. Following the completion of the metal frame, a trial fit was conducted. Then, the bite rim was constructed, the vertical measurements were measured, the tooth color was chosen, and the model was placed on the articulator. The arranged teeth were then tried in the next stage. Subsequent laboratory work entails shaping teeth, packing acrylic, polishing, and fitting patients for dentures. The stability and retention of the dentures, patient comfort when wearing them, phonetics, occlusion, and patient articulation were all considered during insertion. A week later, the patient in the first and second controls was happy; the denture was used to chew food as usual, and the patient had no complaints. (Figure 2).



Figure 2. A metal framework design for periodontal compromised patients. Use of double lingual bar for permanent splint

2.2. Case 2

A 38-year-old man came to the Oral and Dental Hospital USU complaining of bleeding gums and bad breath. The patient did not have systemic disease based on the history. Horizontal teeth brushing pattern with short movements. Clinical examination showed poor oral hygiene and tooth mobility. The treatment plan will be carried out using oral hygiene instructions, scaling, root planing, evaluation and maintenance therapy, and surgical treatment of flaps surgery with bone grafting on the tooth



Figure 3. Metal framework denture for periodontal compromised patients in the upper arch

Scaling, root planing, occlusal adjustment, splinting with fiber, and flap surgery were done. Based on working models, it was decided to create a metal frame with an Aker's clasp design on pages 15 and 16. Adjacent teeth were prepared to create a resting place for teeth 15, 16, 25, and 27. Following the completion of the metal frame, the model was installed on the articulator, the bite rim was made, the tooth color was chosen, and a trial fit was performed. The positioning of the mandibular and maxillary teeth and testing them on the patient come next. Following that, laboratory work involved shaping acrylic teeth, polishing, and fitting patients with dentures. The stability and retention of the dentures, patient comfort when wearing the dentures, phonetics, occlusion, and patient articulation were all considered during insertion. (Figure 3).

3. Discussion

The goals of periodontal therapy are to protect natural teeth and enhance and maintain periodontal comfort, function, and health. Mechanical debridement was the core of any periodontal therapy and could be achieved by non-surgical and/or surgical therapy with instructions in self-administered oral care. [4] The denture frame design was made by considering the condition of the periodontal tissue. Each removable partial denture will have the following components: major connector, minor connector, occlusal rest, direct retainer, and indirect retainer. [11,12] The removable partial denture's major connectors connect its parts on opposing sides of the arch. Major connectors must be rigid for optimal cross-arch stability and resistance against mastication forces.[13].

In the first case, tooth mobility occurred in the anterior part of the lower jaw, 31,32,41,42, degree 2 mobility, and the edentulous was 35,36. The major RB connector used is a double lingual bar. It consists of a lingual bar and a secondary bar above the anterior teeth cingula that functions as a permanent splint. The secondary bar functions as an indirect support and plays a role in the horizontal stabilization of the teeth.¹⁴ In the second case, the partial denture's metal frame uses a major connector anteroposterior palatal bar. Its indications for Kennedy Class I, II, IV. Anterior and posterior abutment teeth are far apart, also in patients who cannot adapt to a full palatal plate. The torus palatinus is large but does not extend to the border of the hard and soft palate. This connector was chosen because it is rigid, has excellent support, and covers the broadest palatal tissue so that pressure can be distributed evenly. The shallow palate condition, in this case, is also one of the reasons for using this connector.[11]

Periodontal surgery should be taken into consideration as the subsequent treatment if scaling and root planing fail to achieve therapy objectives.[7] Teeth mobility may increase due to attachment loss and alveolar bone loss. A significant clinical finding that predicted treatment outcome was tooth mobility.[5] Splinting was therefore advised as a therapy to stabilize the tooth. Splinting was used to redistribute forces, maintain the integrity of the arch, restore functional stability, improve the patient's psychological state, and stabilize moving teeth while surgery was being performed. There are three types of splints: provisional, permanent, and temporary. This short-term, typically less than six- month splint was to support teeth while periodontal therapy was being administered.

For a few months, the temporary splint is utilized for diagnostic purposes, allowing the clinician to see how the teeth respond to treatment.[9] After the temporary splint, the clinician suggests using a permanent splint, which could be either fixed or removable. This denture would stabilize, disperse occlusal force, and stop teeth from migrating vertically and horizontally. The remaining teeth could, therefore, proceed to function correctly.

Before installing metal frame dentures, periodontal therapy was required to increase the teeth' capacity to withstand occlusal force.[4] According to Pereira et al., splinting occasionally made maintaining proper oral hygiene more difficult, particularly in the interdental spaces. Regarding eliminating biofilm and reducing gingival inflammation, interdental tooth brushing was more effective than conventional tooth brushing.¹⁵ In this instance, a metal frame denture was advised because of the patient's inadequate oral hygiene practices. Metal frame dentures could be used as a permanent splint to replace lost teeth and stabilize the remaining teeth.[10] This denture was a component of periodontal therapy and needs to be completed as soon as the patient's periodontal tissue heals from the prior periodontal therapy.

As Oktawati S. et al. suggested, Phase II includes periodontal surgery to prepare periodontally impaired teeth for permanent splinting with a metal frame partial denture. Periodontal therapy was required before the metal frame denture was constructed to increase the teeth' capacity to withstand occlusal stress. The metal frame denture improves mastication efficiency and serves as a stabilizer.[4]

4. Conclusion

Sequence periodontal treatment was held before splinting using a metal framework to prepare periodontally compromised teeth. The function of a metal frame denture can be as a permanent splint to obtain good stability for existing teeth while replacing teeth that have been lost.

References

- [1] Campbell, S. D., Cooper, L., Craddock, H., Hyde, T. P., Nattress, B., Pavitt, S. H., & Seymour, D. W. (2017). Removable partial dentures: The clinical need for innovation. *The Journal of prosthetic dentistry*, 118(3), 273-280.
- [2] Lyons, K. M., & Darby, I. (2017). Interdisciplinary periodontics: the multidisciplinary approach to the planning and treatment of complex cases. *Periodontology 2000*, 74(1), 7-10.
- [3] Doukeridou, C., Vouros, I., Petridis, A., Athanasia-Eirini, Z., & Theodoridis, C. (2020). Interdisciplinary approach in periodontology-a mini-review and a report of two complex cases. *Dental Research and Oral Health*, 3(3), 107-120.
- [4] Oktawati, S., Asalui, T. R., Mardiana, A., Nardiatmo, S. P. S., & Haryo, H. M. (2020). Surgical approach to treat chronic periodontitis and followed with metal frame partial denture: A case report. *Medicina Clinica Practica*, 3, 100104.
- [5] Djais, A. I., Oktawati, S., Achmad, H., Jubhari, E. H., Rahmam, S., Salam, F., ... & Tetan-El, D. A. N. I. E. L. (2020). Periodontal considerations for denture placement: A literature review. *International Journal of Pharmaceutical Research* (09752366), 12(4).
- [6] Papapanou, P. N., Sanz, M., Buduneli, N., Dietrich, T., Feres, M., Fine, D. H., ... & Tonetti, M. S. (2018). Periodontitis: Consensus report of workgroup 2 of the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions. *Journal of periodontology*, 89, S173-S182.
- [7] Graziani, F., Karapetsa, D., Mardas, N., Leow, N., & Donos, N. (2018). Surgical treatment of the residual periodontal pocket. *Periodontology 2000*, 76(1), 150-163.
- [8] Kinane, D. F., Stathopoulou, P. G., & Papapanou, P. N. (2017). Periodontal diseases. *Nature reviews Disease primers*, 3(1), 1-14. *dental Science*, 26(3).
- [9] Bhuvaneswari, P., Gowri, T., Kumar, R., & Vanitha, M. (2019). Periodontal splinting: A review before planning a splint. *International Journal of Applied Dental Sciences*, 5(4), 315-9.
- [10] MIR, A. A., Siswanto, H., & Aprianto, D. S. (2023). The Metal Frame Removable Partial Denture with Swing Lock Design as a Periodontal Splint Treatment. *E- Prodenta Journal of Dentistry*, 7(1), 798-806.
- [11] Carr, A. B., & Brown, D. T. (2010). *McCracken's removable partial prosthodontics-e-book*. Elsevier Health Sciences.
- [12] Kamadjaja, M. J. K., Waluyo, W. H., & Rahmawati, N. P. (2023). Use of Metal Frame Removable Partial Denture in Rheumatoid Arthritis: A Case Report. *Journal of Medicinal and Chemical Sciences*, 6(3), 1878-1884.
- [13] Akl, M. A., & Stendahl, C. G. (2022). Removable partial denture frameworks in the age of digital dentistry: A review of the literature. *Prosthesis*, 4(2), 184-201.
- [14] Phoenix, R. D., Cagna, D. R., & DeFreest, C. F. (2003). *Stewart's clinical removable partial prosthodontics*.
- [15] Pereira CK, Passos VF, da Silva Pereira SL. Stabilizing periodontally compromised teeth with glass fiber-reinforced composite resin – case report. *RSBO* 2017; 13:217–22.